Experimental Days 4-7 Winter Storm Threat
Product Description Document (PDD)

Revised: 07 January 2016

Part 1 – Mission Connection

A. Product / Service Description:

Alerting the public to possible weather threats is core to the Weather Forecast Office (WFO) mission. Public, commercial and government users all desire and expect information on winter storms that may threaten their area(s) of interest. The National Weather Service (NWS) provides detailed watches and warnings for winter storms that have reached a certain threshold of certainty within the Day 1-3 period. However, we are largely silent with less certain but potentially significant and impactful winter storm threats (snow, sleet and/or freezing rain) in Days 4-7 of the forecast.

While the NWS text-based Hazardous Weather Outlook (HWO) plays a supporting role in identifying potential winter threats, at times our core customers can become confused when social media/private weather services highlight potential winter threats in days 4-7, while the NWS says little for that period.

Starting December 1, 2015, NOAA/NWS's Weather Prediction Center (WPC) and Environmental Monitoring Center (EMC) began generating new experimental probabilistic winter guidance that helps address this problem. This guidance can be analyzed, combined, and downscaled by the WFOs, to provide planning information for the public and core partners. This process involves two core principles that are the basis of effective communication of risk to the public – communicating with easy-to-understand graphics, and using multi-model ensembles to objectively capture the full range of winter threat possibilities in the Days 4-7 timeframe.

Starting January 4, 2016, the NWS WFO in Sterling, VA, began producing an experimental Days 4-7 Winter Storm Threat product. The format used of this new product consists of a plan view map graphic depicting one of 5 winter threat levels of potential winter impact and a graphic of matrix highlighting winter impact vs. forecast confidence. For each day within days 4-7, the level of threat that the matrix derived can be shown on a map on our webpage using an easily-understood color code (green, yellow, orange, red and purple). The matrix itself can also be displayed for those that want detail about level of confidence and potential impact.

B. Purpose/Intended Use:

The Days 4-7 Winter Storm Threat product is designed to provide decision makers with information about the level of risk posed by a winter storm in the Day 4-7 forecast period – information that's easily understood and disseminated. This information will aid in preparedness and readiness in the community. This graphical approach to conveying winter threats in Days 4-7 works in conjunction with the text-based NWS HWO product. This process could be a potential input into graphical hazardous weather outlooks or dashboard paradigm applications.

C. Audience:

The Days 4-7 Winter Storm Threat product is intended to provide information on potential weather threats to a wide range of decision makers, including local, state, or federal level official, as well as the general public.

This service also serves internal NWS operations by enhancing situational awareness and ensuring service consistency. The integration of WPC's probabilities, EMC's guidance, and local warning criteria, results in a system that alerts forecasters when winter threats exist in the multi-model ensemble suite.

D. Presentation Format:

The Days 4-7 Winter Storm Threat product consists of four plan view maps within WFO Sterling's County Warning Area (CWA) of responsibility; each map highlighting one of 5 levels of winter threat for each day 4-7. For each map, a complementary winter threat matrix graphic specifies the winter threat based on forecaster confidence and potential impact. Core partners can use this information, for example, to help convey the winter

threat for the general public. The products are linked via the Baltimore/Washington/WFO winter home page.

E. Feedback Method:

An email link to leave feedback is available on the webpage for user feedback to use in future product refinement. The comment/feedback period will run while the product is in experimental mode throughout the winter 2015-16.

Technical or general comments may be addressed to:
National Weather Service
Attn: Chris Strong
43858 Weather Service Road
Sterling, VA 20166
or e-mail comments to: christopher.strong@noaa.gov

Part 2 – Technical

A. Format and Science Basis:

The Days 4-7 Winter Storm Threat product will be provided for two areas of our CWA - west of the Blue Ridge & Catoctin Mountains & east of the Blue Ridge & Catoctin Mountains (see map, Figure 1). The product will be driven by a threat matrix of confidence vs. potential impact for each day within the day 4-7 forecast.

The matrix will assess confidence and impact from three different inputs:

1. **Probability of precipitation >0.25" expected to be frozen (i.e., snow and/or sleet).**
    a. Provides a base level of threat from WPC, utilizing their multi-model ensemble.

2. **Probability of precipitation >0.50" expected to be frozen/freezing.**
    a. WFO forecaster analysis of NCEP model ensemble data.

3. **Analysis of forecast 925mb & 850mb u-wind anomalies and 850mb temperature anomaly.**
    a. WFO forecaster analysis of NCEP model ensemble data to determine potential impact.

These three inputs combine the best available guidance from WPC utilizing the multi-model ensembles to produce a base level of threat, with the WFO forecaster analysis of, for example, NCEP's Global Ensemble Forecast System (GEFS) data to provide insights on levels of enhanced threat. For details about the logic on how threat is determined, consult the flow chart provided in Section C below.

If there's a discernable winter threat, a 3x3 matrix is displayed overlain on the map. The matrix shows a checked box that highlights the best threat level within the 3x3 forecast confidence vs potential impact matrix. The matrix box is viewed by clicking on any of the Days 4-7 threat maps. The color codes depicted on both the map and in the matrix use colors commonly associated with threat depiction: green, yellow, orange, red, purple (see Fig 2). If there's no discernable winter threat, the threat matrix is not displayed; instead a green box ("no significant winter threat expected") is shown. An algorithm is run to assess the 3 inputs provided by WPC and the WFO forecaster, and find where in the matrix the threat is for each day within each of the two Winter Storm Threat areas.

B. Availability:

This service is available as an experimental product 24 hours a day and 7 days a week between January 4, 2016, and April 15, 2016. It will be updated at least twice daily at 0900 and 2100 UTC (and as needed).

Direct, real-time access to the Days 4-7 Winter Storm Threat product is obtained through our winter webpage:
http://www.weather.gov/lwx/winter#wsoutlook

C. Additional Information: See below for maps/matrix example and legend description.

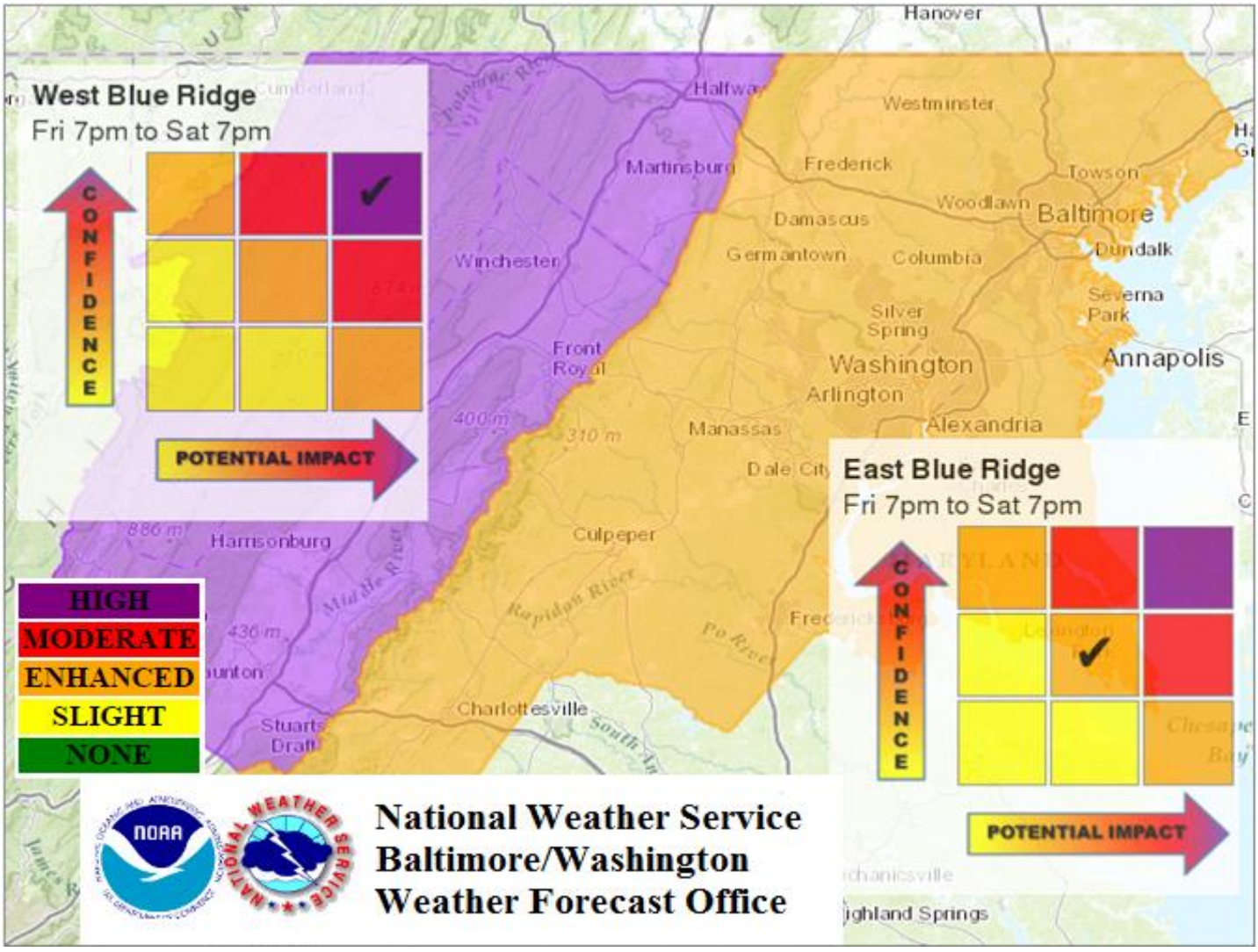

Figure 1 NWS WFO Sterling (LWX) Days 4-7 Experimental Winter Threat Outlook Map/Matrix

THREAT

High	**High threat of high impact winter storm.** Potential impacts include significant travel delays, closures, and threats to life and property. Plan ahead to minimize impact on you and your family.
Moderate	**Moderate winter storm threat.** Potential impacts include significant travel delays and closures. Plan ahead to minimize impact on you and your family.
Enhanced	**Enhanced winter storm threat.** Primary threat is disruption to travel.
Slight	**Slight winter storm threat.** May cause travel disruptions, particularly if threat increases.
None	**No significant winter storm threat is currently expected.** However, light wintry precipitation may still be possible.

Figure 2 Definitions of potential winter storm impacts used in WFO Sterling's (LWX) Days 4-7 Experimental Winter Threat Outlook